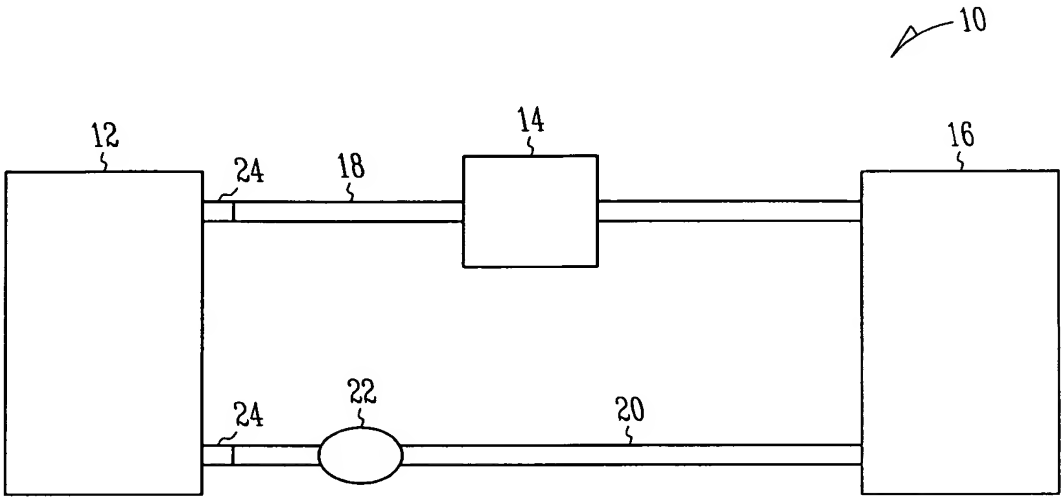

FIG. 1

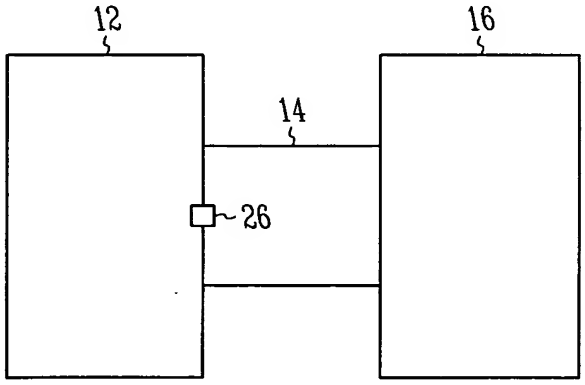

FIG. 2

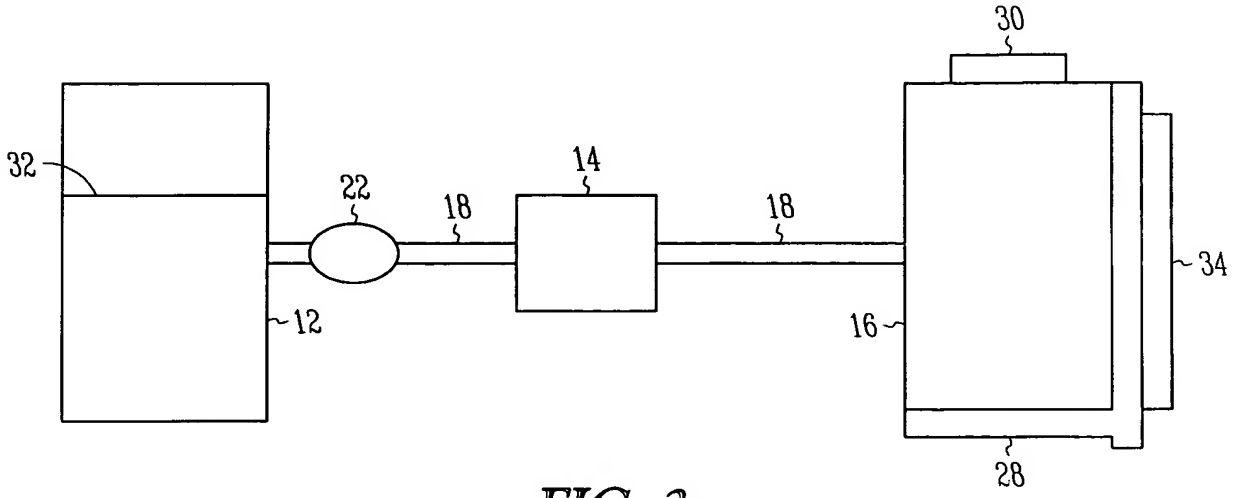
30
32
22
18
14
18
34
12
16
28

FIG. 3

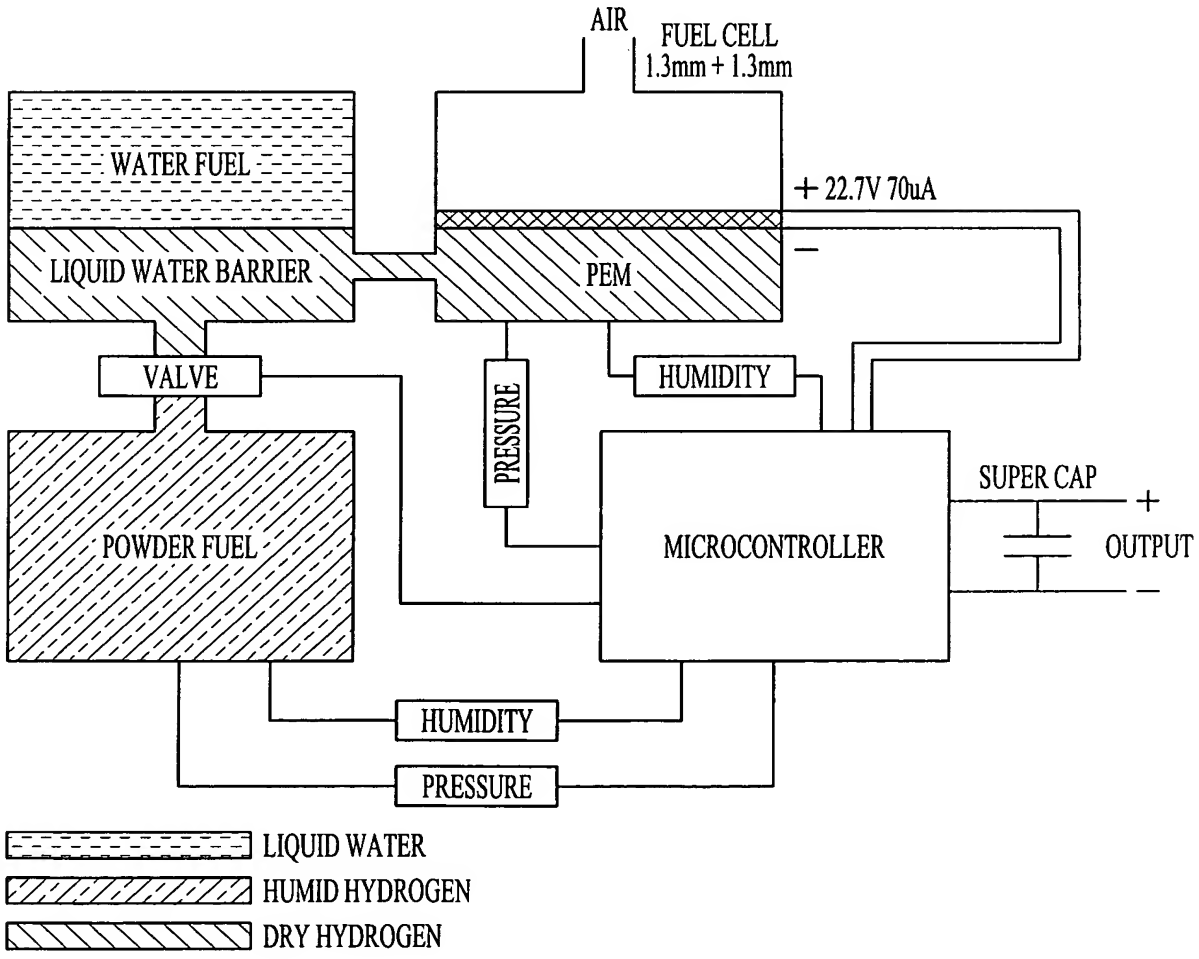
AIR
FUEL CELL
1.3mm + 1.3mm
WATER FUEL
+ 22.7V 70uA
LIQUID WATER BARRIER
PEM
VALVE
PRESSURE
HUMIDITY
SUPER CAP
POWDER FUEL
MICROCONTROLLER
OUTPUT
HUMIDITY
PRESSURE
LIQUID WATER
HUMID HYDROGEN
DRY HYDROGEN

FIG. 4

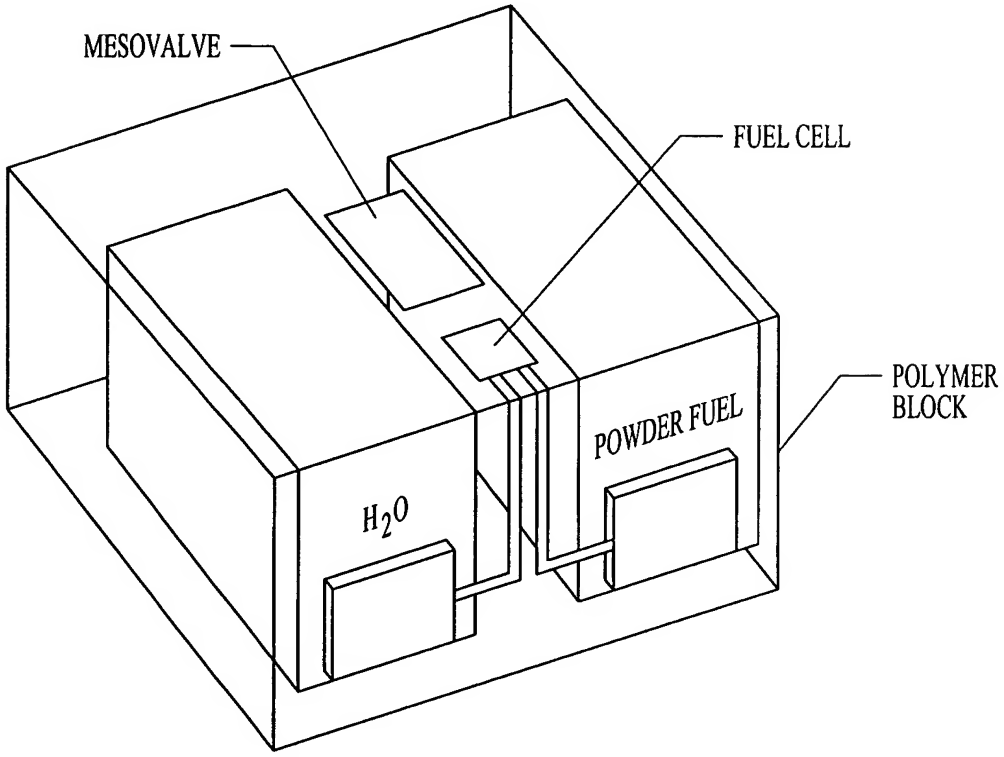
MESOVALVE
FUEL CELL
POLYMER BLOCK
POWDER FUEL
H_2O

FIG. 5

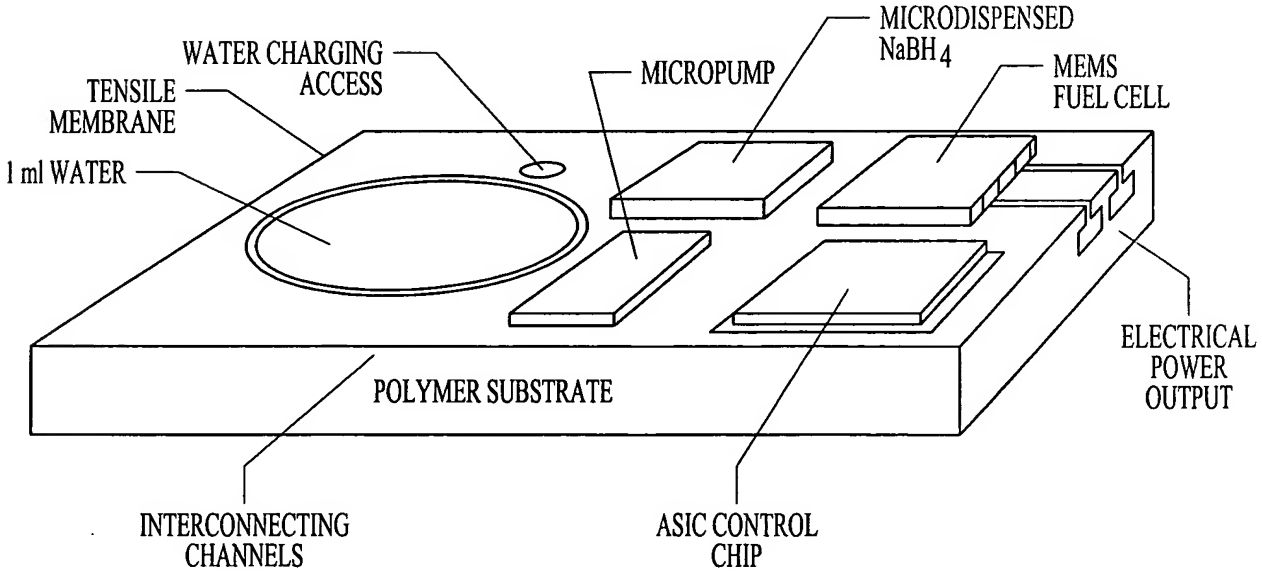
WATER CHARGING ACCESS
TENSILE MEMBRANE
1 ml WATER
MICROPUMP
MICRODISPENSED $NaBH_4$
MEMS FUEL CELL
ELECTRICAL POWER OUTPUT
POLYMER SUBSTRATE
INTERCONNECTING CHANNELS
ASIC CONTROL CHIP

FIG. 6

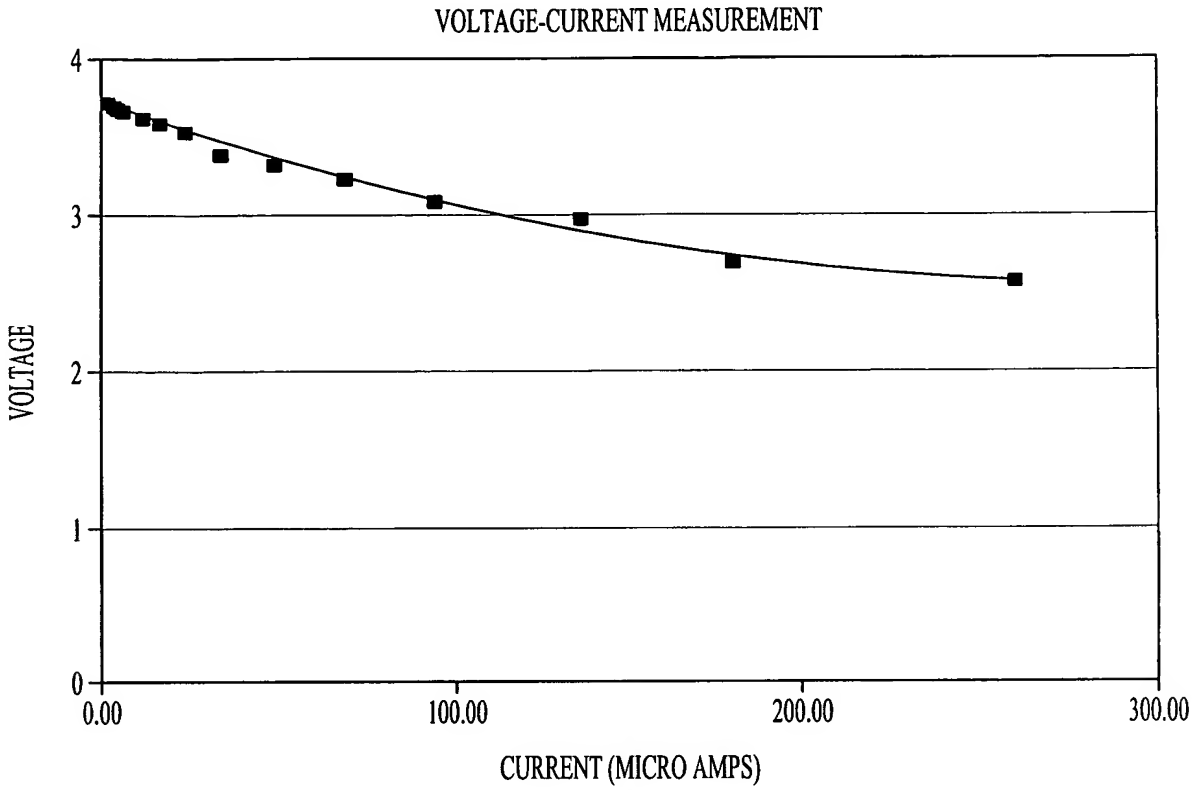
VOLTAGE-CURRENT MEASUREMENT
VOLTAGE
4
3
2
1
0
0.00
100.00
200.00
300.00
CURRENT (MICRO AMPS)

FIG. 7

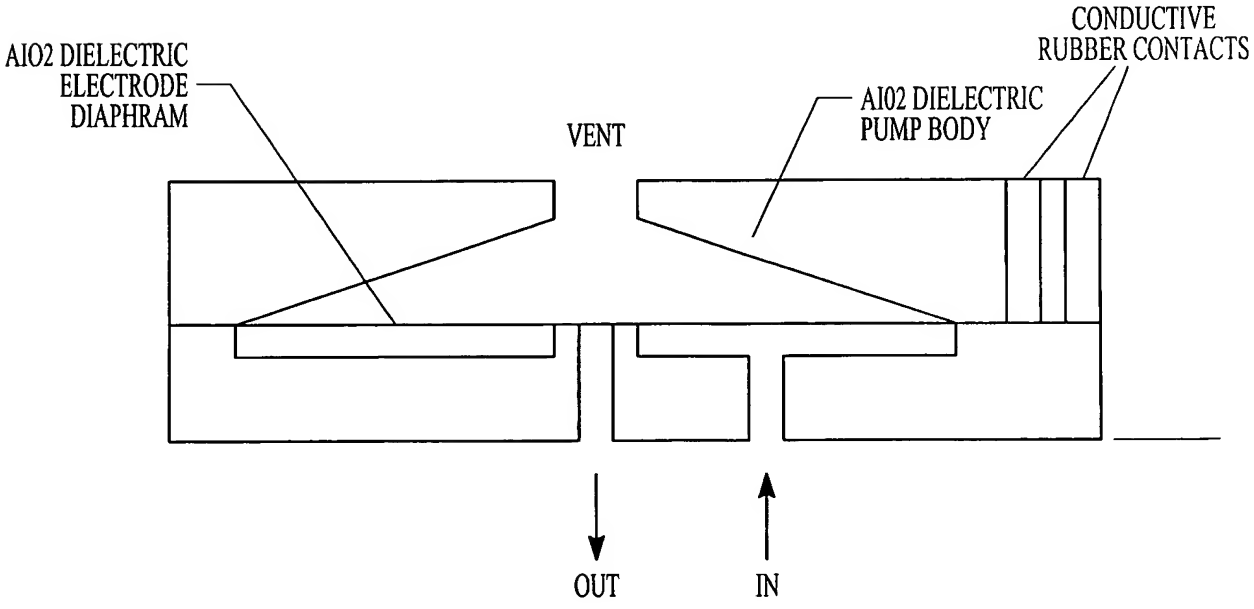
AlO2 DIELECTRIC
ELECTRODE
DIAPHRAM
VENT
AlO2 DIELECTRIC
PUMP BODY
CONDUCTIVE
RUBBER CONTACTS
OUT
IN

FIG. 8

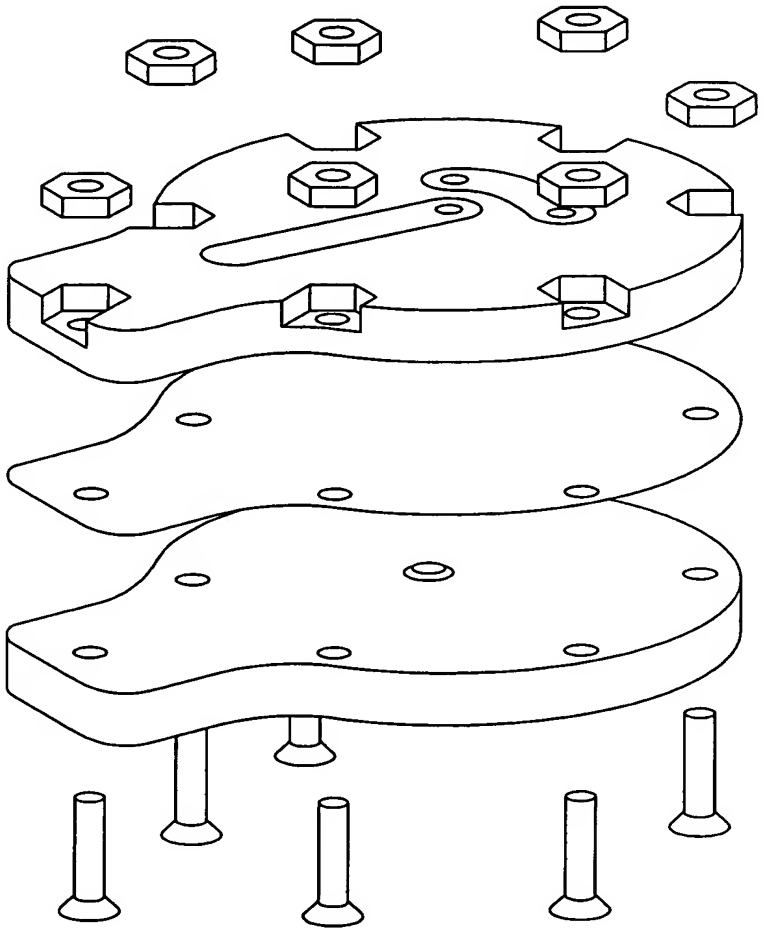

FIG. 9

DOUBLE POLISHED Si WAFER WITH THERMAL OXIDE AND LPCVD NITRIDE SUITABLE FOR CREATING THROUGH THE WAFER ETCH HOLES

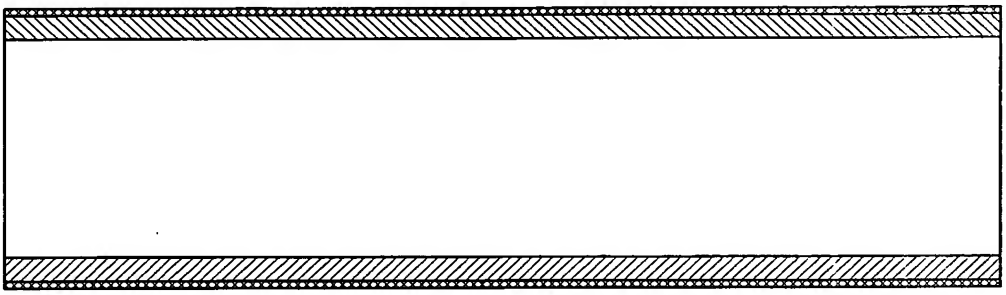

FIG. 10A

STRIP OFF NITRIDE AND OXIDE FROM FRONT OF WAFER, GROW THIN THERMAL OXIDE AND BRIDGE DIELECTRIC (NITRIDE)

FIG. 10B

DEPOSIT AND PATTERN LOWER ELECTRODE, SUCH AS TiW/Au OR Cr/Au

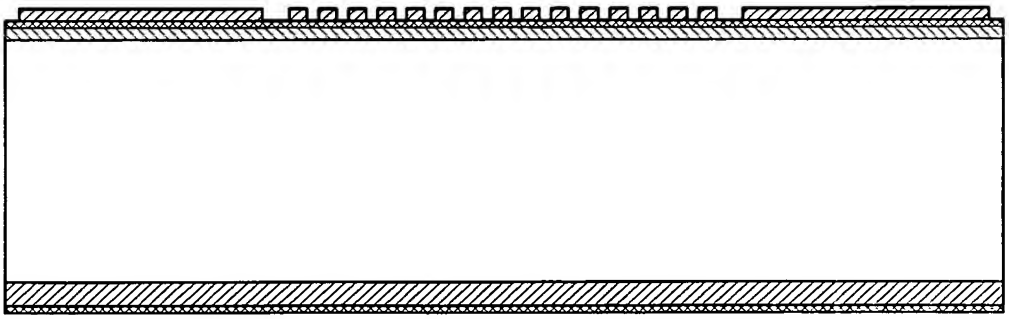

FIG. 10C

DEPOSIT AND PATTERN LOWER ELECTRODE, SUCH AS TiW/Au OR Cr/Au

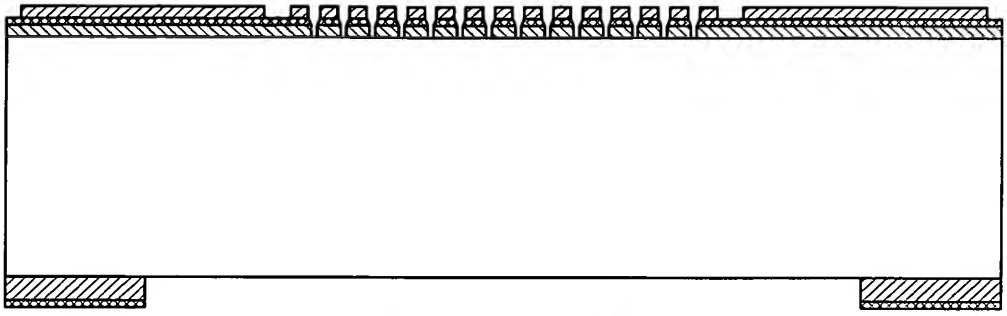

FIG. 10D

ETCH FROM BACKSIDE TO RELEASE DIAPHRAGMS

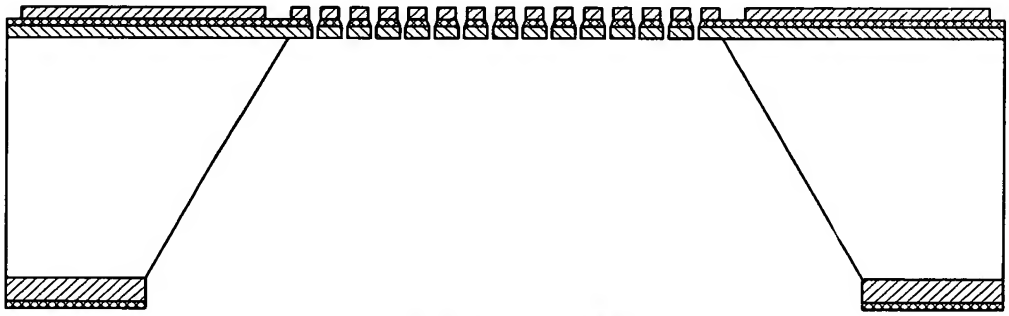

FIG. 10E

APPLY CATALYTIC PASTE BY "DOCTOR BLADING"

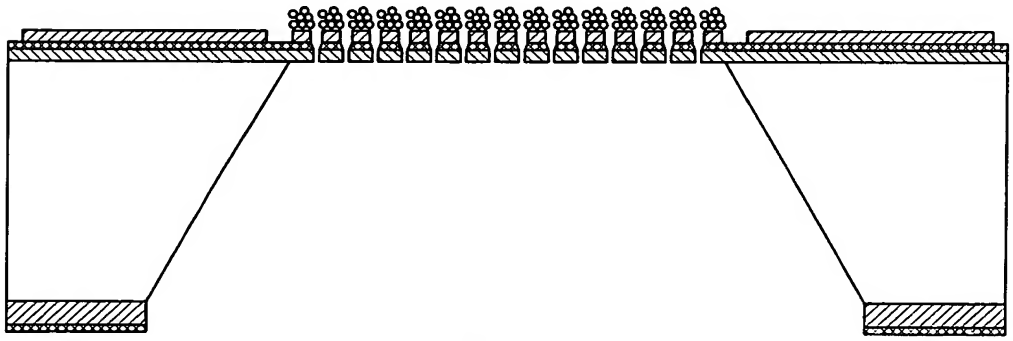

FIG. 10F

APPLY PEM LAYER SUCH AS BY SPINNING

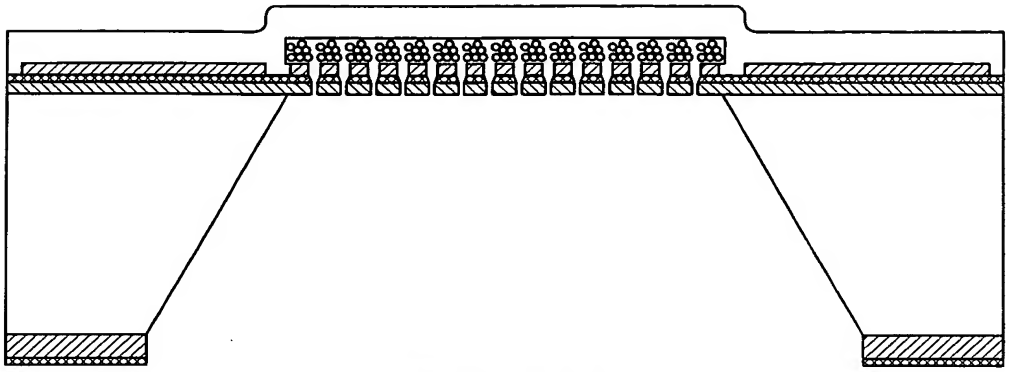

FIG. 10G

PATTERN PEM LAYER

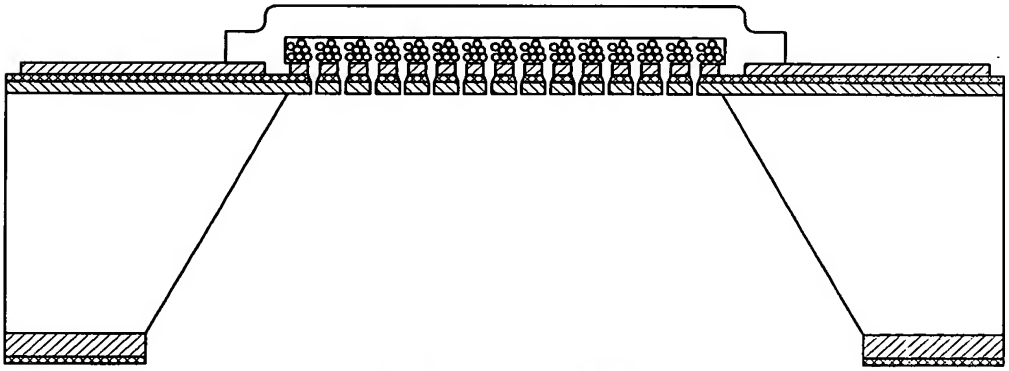

FIG. 10H

APPLY AND PATTERN UPPER ELECTRODE

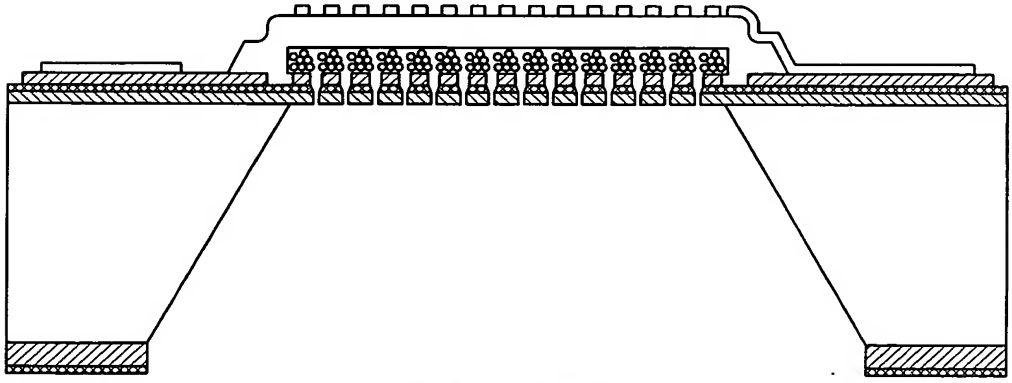

FIG. 10I

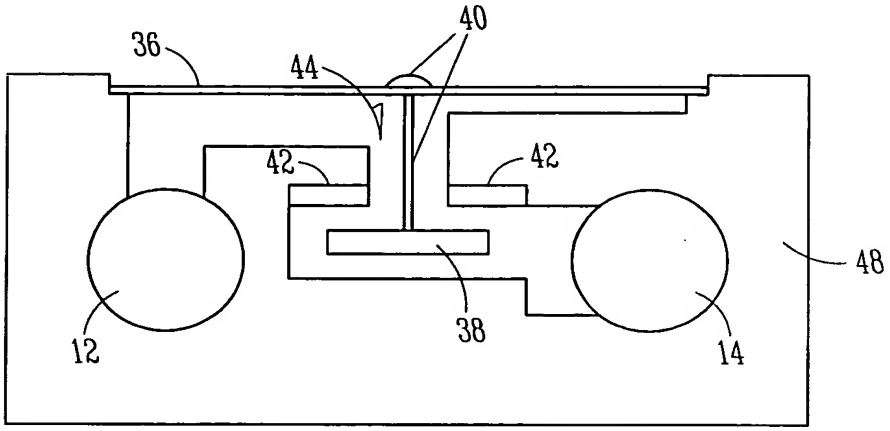

FIG. 11

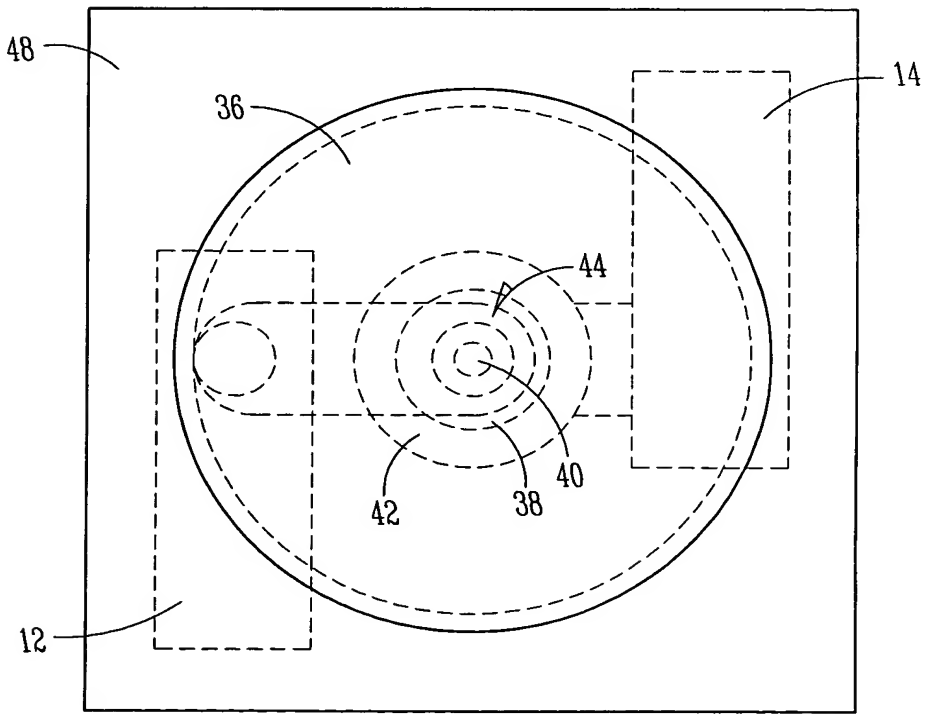

FIG. 12

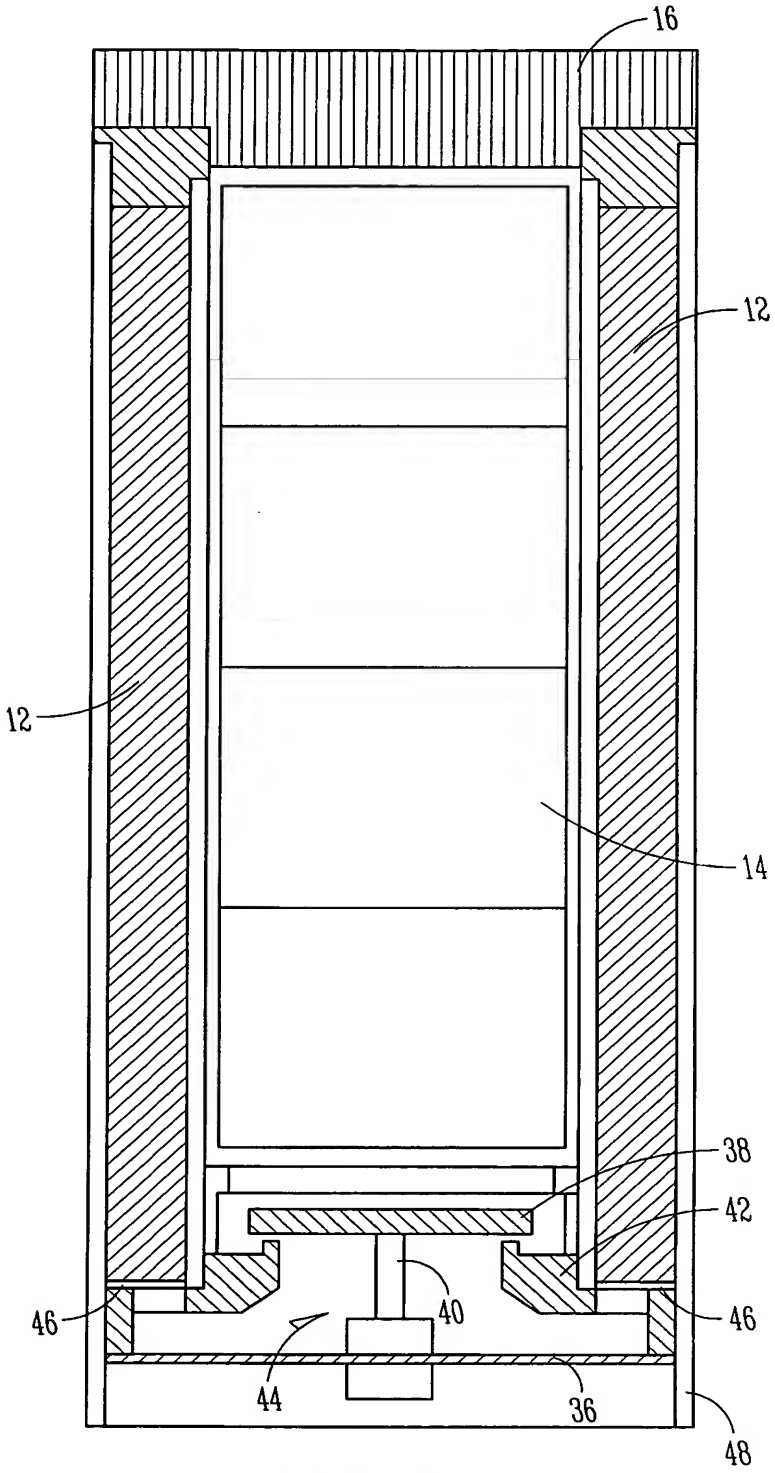

FIG. 13